

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

REMARKS

Introduction

Upon entry of the foregoing amendment, claims 1, 3-7 and 9-17 are pending in the application. Claim 1 has been amended. No new matter is being presented. In view of the following remarks, reconsideration and allowance of all the pending claims are requested.

Request for Withdrawal of Finality of Office Action

As discussed below with regard to the rejections under 35 USC §112, the Examiner has stated that claims are "either too ambiguous for the Examiner to understand or not possible." Nonetheless, the Examiner applies the same references as applied in the previous Office Action to reject claims. The Examiner's application of the simplified scalar version of Ohm's law is inappropriate to the system being claimed, and it is for that reason that the Examiner is confused. It is Applicants' position that the ordinarily skilled artisan in the pertinent art would understand the inventive concept described and claimed in the subject patent application, and if the specification and claims are ambiguous to the point that the Examiner cannot understand, then final rejection of the claims is premature since obviously a clear issue has not been developed between Applicants and the Examiner (see MPEP §706.07). As is also stated in MPEP §706.07:

While the rules no longer give to an applicant the right to "amend as often as the examiner presents new references or reasons for rejection," present practice does not sanction hasty and ill-considered final rejections. **The applicant who is seeking to define his or her invention in claims that will give him or her the patent protection to which he or she is justly entitled should receive the cooperation of the examiner to that end, and not be prematurely cut off in the prosecution of his or her application.** But the applicant who dallies in the prosecution of his or her application, resorting to technical or other obvious subterfuges in order to keep the application pending before the primary examiner, can no longer find a refuge in the rules to ward off a final rejection. (Emphasis added)

Applicants review for the Examiner film deposition in light of the inventive concept below with regard to the rejections under 35 USC §112. Applicants respectfully request that the Examiner

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

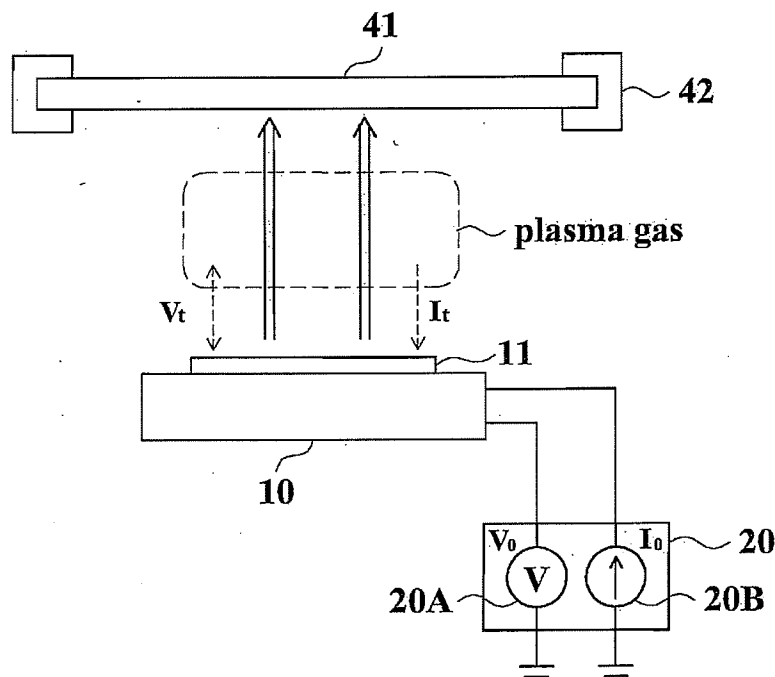
withdraw the finality of the present Office Action, consider the further explanations below, and provide any issues of patentability in view of the Examiner's newly-acquired understanding of the inventive concept of the subject patent application in a subsequent Office Action.

Rejection under 35 USC §112

I. Claims 1, 3-7 and 9-17 have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner contends that:

Claim 1 claims to separate an electric voltage and an electric current. Claim 7 claims to apply an electric voltage, followed by applying an electric current. This is considered either too ambiguous for the Examiner to understand or not possible. (See Detailed Action, page 2, item 2).

The Examiner cites the "well known equation of: Voltage (V) = Current (A) × Resistance (Ω)," but this simplified form of Ohm's law is only valid under linear I-V relationships, and does not hold in all regions of the I-V response in film deposition. Consider the illustration below, which is a simplified version of FIG. 2 of the subject patent application.



Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

Referring to the illustration above, the voltage of the target 11, which will be referred to herein as V_t , is a potential difference between the target 11 and the charge of the plasma gas, and I_t refers to the ion current in the chamber corresponding to the voltage V_t . The target voltage V_t is only responsive to the voltage V_0 when the growth of an oxide film on the target and a concentration of flow of ions and electrons in the plasma allow such response. As an oxide is formed on the target, the relationship between the voltage V_0 and I_0 is no longer linear, and the simplified version of Ohm's law breaks down. In film deposition, one must consider the vector equation $\mathbf{J} = \sigma \cdot (\mathbf{E} + \mathbf{v} \times \mathbf{B})$ to account for all of the currents resulting from the electric and magnetic fields in the apparatus. The power control part 20 of the present general inventive concept supplies a current I_0 to increase the target voltage V_t when the voltage V_t no longer responds to an increase in V_0 . With the application of I_0 , V_t and I_t increase, and, consequently the power on the magnesium target increases. Thus, it is respectfully submitted that when the correct physical laws are considered, the subject claims recite subject matter that would enable one of ordinary skill in the art to make and use the invention. Accordingly, withdrawal of the rejections and allowance of the subject claims are earnestly solicited.

II. Claims 1, 3-6 and 16 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Examiner states that there is no support for the claimed "applying an electric current to the magnesium target by the power control part to increase power on the magnesium target when the applied voltage on the magnesium target stops increasing in response to an increase in the applied voltage." Claim 1 has been amended to now recite, "increase power on the magnesium target when the voltage on the magnesium target stops increasing in response to an increase in the applied voltage," which is supported throughout the specification, such as, for example, in paragraph [0033]. Additionally, the Examiner is respectfully referred to section I above. Accordingly, withdrawal of the rejections and allowance of the subject claims are earnestly solicited.

III. Claims 7, 9-15 and 17 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the Official Action, the Examiner states that the Examiner is unclear as to how a current will be applied after the voltage stops increasing with the applied

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

voltage. The Examiner is respectfully referred to the discussion above with regard to sections I and II. Accordingly, withdrawal of the rejections and allowance of the subject claims are earnestly solicited.

Rejection under 35 USC §103

I. Claims 1, 3-4 and 16 have been rejected under 35 U.S.C. §103(a) as being unpatentable by U.S. Patent No. 6,337,001 to Hagg, et al. (hereinafter "Hagg"), in view of U.S. Patent No. 5,622,608 to Lanford, et al. (hereinafter "Lanford"). Reconsideration of the rejections is respectfully requested for at least the reasons discussed below.

Claim 1

In the Official Action, the Examiner takes the position that Haag allegedly discloses "a sputtering apparatus capable of applying an increasing voltage to at least one target (figure 12, part "c") through a magnetic field. The Examiner further contends that "[e]lectrical voltage has been shown to be directly correlated to electrical current. Since the voltage is increasing, the current must increase as well." See Detailed Action, item 9, lines 11-12. The Examiner admits that Haag fails to disclose an increasing voltage during deposition and cites Lanford as allegedly disclosing such.

It is respectfully submitted that Haag, Lanford and the combination of references nowhere discloses or suggests "applying an electric current to the magnesium target by the power control part to increase power on the magnesium target when the voltage on the magnesium target stops increasing in response to an increase in the applied voltage," as presently recited in claim 1. In fact, neither Haag nor Lanford disclose, teach or suggest any capability or mechanism to apply a voltage and an electric current separately to at least one magnesium target, and cannot therefore fulfill the operations recited in independent claim 1. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Thus, for at least the reason that Haag and

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

Lanford, separately and combined, fail to disclose, teach or suggest, "applying an electric current to the magnesium target by the power control part to increase power on the magnesium target when the voltage on the magnesium target stops increasing in response to an increase in the applied voltage," as presently recited in the subject claim, and the Examiner has not presented a clear line of reasoning as to how such would be obvious in light of the references, the references cannot make obvious this claim. Accordingly, reconsideration and allowance of independent claim 1 are earnestly solicited.

Claims 3, 4 and 16

Dependent claims 3, 4 and 16 incorporate all of the elements recited in independent claim 1. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Thus, the subject dependent claims are nonobvious for at least the same reasons for which independent claim 1 is nonobvious. Accordingly, withdrawal of the rejections and allowance of dependent claims 3, 4, and 16 are earnestly solicited.

II. Claims 5-6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Haag and Lanford in view of U.S. Publication No. 2001/0050220 to Chiang, et al. (hereinafter "Chiang").

Claims 5 and 6 incorporate all of the operations and limitations set forth in independent claim 1, which, as stated above, are not disclosed or taught by Haag and Lanford. Chiang was cited by the Examiner as allegedly disclosing certain functional details recited in claims 5 and 6 that are not taught by Haag and Lanford. However, Chiang fails to overcome the deficiencies of Haag with respect to independent claim 1, such as, for example, the "applying an electric current to the magnesium target by the power control part to increase power on the magnesium target when the voltage on the magnesium target stops increasing in response to an increase in the applied voltage." Thus, for at least the reason that dependent claims 5 and 6 inherently recite the combination of operations of independent claim 1, which is nowhere taught in Haag, in Lanford, in Chiang, and in the combination of the references, claims 5 and 6 are patently distinguished over the references cited. Accordingly, reconsideration and allowance of these claims are earnestly solicited.

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

III. Claims 7, 10-13, 15 and 17 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Haag and Lanford in view of U.S. Patent No. 6,337,001 to Stollernwerk, et al. (hereinafter "Stollernwerk"). Reconsideration and allowance of the subject claims are respectfully requested for at least the reasons discussed below.

Claim 7

In the Official Action, the Examiner cites Haag as allegedly disclosing "a sputtering apparatus capable of applying an increasing voltage to at least one target (figure 12, part "c") through a magnetic field," in similar manner as in the rejection of independent claim 1. The Examiner admits that Haag fails to disclose an increasing voltage during deposition and cites Lanford as allegedly disclosing such. The Examiner further admits that Haag and Lanford do not include a heater control part, and relies on Stollernwerk as allegedly disclosing such. The Examiner takes the position that it would have been obvious to use the heater taught in Stollernwerk with the apparatus in Haag and Lanford to gain the advantages of better MgO film coating by controlling the heating and cooling of the substrate.

Similar to the discussion of claim 1 above, Haag and Lanford fail to disclose or suggest, "a power control part to apply a voltage and an electric current separately to the magnesium target, the power control part applying the voltage and subsequently applying the current when the voltage on the magnesium target stops increasing when the applied voltage increases," as presently recited in independent claim 7. Stollernwerk was cited as disclosing the heating control recited in claim 7 missing in Haag and Lanford, but fails to disclose the power control part also missing in Haag and Lanford. Thus, for at least the reason that Haag, Lanford, and Stollernwerk fail to disclose "a power control part to apply a voltage and an electric current separately to the magnesium target, the power control part applying the voltage and subsequently applying the current when the voltage on the magnesium target stops increasing when the applied voltage increases," as presently recited in independent claim 7, even when combined, the references cannot make obvious the subject claim. Accordingly, reconsideration and allowance of independent claim 7 are earnestly solicited.

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

Claims 10-13, 15 and 17

Dependent claims 10-13, 15 and 17 incorporate all of the elements recited in independent claim 7. Thus, for at least the reason that independent claim 7 is nonobvious, dependent claims 10-13, 15, and 17 are nonobvious in view of In re Fine cited above. Accordingly, reconsideration and allowance of dependent claims 10-13, 17 and 19 are earnestly solicited.

IV. Claim 9 is rejected under 35 U.S.C. §103(a) as being unpatentable over Haag, Lanford, and Stollernwerk as applied to claim 7 and further in view of Chiang.

Claim 9 incorporate all of the elements and limitations set forth in independent claim 7, which, as stated above, are not disclosed or taught by Haag and Lanford. Chiang and Stollernwerk were cited by the Examiner as allegedly disclosing certain structural details recited in claim 9 that are not taught by Haag and Lanford. However, Chiang and Stollernwerk fail to overcome the deficiencies of Haag and Lanford with respect to independent claim 7, such as, for example, the “a power control part to apply a voltage and an electric current separately to the magnesium target, the power control part applying the voltage and subsequently applying the current when the voltage on the magnesium target stops increasing when the applied voltage increases.” Thus, for at least the reason that dependent claim 9 inherently recite the combination of elements of independent claim 7, which is nowhere taught in Haag, in Lanford, in Chiang, in Stollernwerk, and in the combination of the references, claim 9 is patently distinguished over the references cited. Accordingly, reconsideration and allowance of this claim are earnestly solicited.

V. Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Haag, Lanford, and Stollernwerk in view of U.S. Patent No. 5,900,391 to Sakakibara, et al. (hereinafter “Sakakibara”).

Claims 14 incorporates all of the operations and limitations set forth in independent claim 7, which, as stated above, are not disclosed or taught by Haag. Stollernwerk and Sakakibara were cited by the Examiner as allegedly disclosing certain functional details recited in claim 14 that are not taught by Haag and Lanford. However, Stollernwerk and Sakakibara fail to

Serial No.: 10/811,946
Docket No.: 9551003
Amendment After Final dated April 3, 2008
Reply to the Final Office Action of December 3, 2007

overcome the deficiencies of Haag and Lanford with respect to independent claim 7, such as, for example, the "a power control part to apply a voltage and an electric current separately to the magnesium target, the power control part applying the voltage and subsequently applying the current when the voltage on the magnesium target stops increasing when the applied voltage increases." Thus, for at least the reason that dependent claim 14 inherently recites the combination of elements of independent claim 7, which is nowhere taught in Haag, in Lanford, in Stollernwerk, in Sakakibara, and in the combination of the references, claim 14 is patently distinguished over the references cited. Accordingly, reconsideration and allowance of this claim are earnestly solicited.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.


If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

STANZIONE & KIM, LLP

Dated: April 3, 2008
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: 
David R. Wood
Registration No. 53,868